

I. Rejections of Claims Under 35 U.S.C. § 102

1. Legal standard for Rejecting Claims Under 35 U.S.C. §102

Under 35 U.S.C. § 102, a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628 (Fed. Cir.), *cert. denied*, 484 U.S. 827 (1987).

2. Response to 35 U.S.C. § 102 Rejections

a. Claims 1-4, 7

Claim 3 recites:

An apparatus for reducing the slew rate of transition edges of a digital signal on a node of an integrated circuit, comprising:

a first switchably conductive device characterized by a first threshold voltage, said first switchably conductive device connected between said node and a voltage source and responsive to a driving signal to allow current conduction from said voltage source to said node when said driving signal is offset from said voltage source by a voltage substantially equal to and greater than said first threshold voltage and to disallow said current conduction when said driving signal is offset from said voltage source by a voltage less than said first threshold voltage; and

a second switchably conductive device characterized by a second threshold voltage greater than said first threshold voltage, said second switchably conductive device connected between said node and said voltage source and responsive to said driving signal to allow current conduction from said voltage source to said node when said driving signal is offset from said voltage source by a voltage substantially equal to and greater than said second threshold voltage and to disallow said current conduction when said driving signal is offset from said voltage source by a voltage less than said second threshold voltage.

The Applicant respectfully traverses the rejection of claim 3 under 35 U.S.C. § 102(b). Davis does not meet the limitations of claim 3. In particular, Davis does not teach or suggest the limitation "a second switchably conductive device characterized by a second threshold voltage greater than said first threshold voltage".

The Examiner refers to secondary transistor device N1, P1 in Davis as the equivalent of Applicant's "first switchably conductive device" and to primary transistor device N3, P3 in Davis as the equivalent of Applicant's "second switchably

conductive device". However, in order for this equivalent to stand, the primary transistor device N3, P3 in Davis would have to have a characteristic threshold voltage greater than the characteristic threshold voltage of the second transistor device N1, P1. However, nothing in Davis indicates that the devices N1 and N3 are characterized by different threshold voltages.

As known in the art, the threshold voltage of a transistor device is an intrinsic parameter of the device itself. The threshold voltage is also known as the "turn-on" voltage. (See Pierret, Robert F., "Volume IV: Field Effect Devices", Modular Series On Solid State Devices, Addison-Wesley Publishing Company (1983), page 93, line 7).

Davis teaches the use of propagation delay to generate a staged turn-on of parallel transistor devices. In Davis, a delay mechanism (inverter 44, 42; transistor N2, P2; and transistor P4, N4) is inserted between the control input of the secondary switching device (N1, P1) and the primary switching device (N3, P3). Thus, there is a propagation delay between the arrival of the VIN voltage to the control input of the secondary switching device (N1, P1) and to the control input of the primary switching device (N3, P3). As a result, secondary switching device (N1, P1) receives the VIN voltage before the primary switching device (N3, P3) receives the VIN voltage, and therefore the secondary switching device (N1, P1) begins turning on prior to the time that the primary switching device (N3, P3) begins turning on.

In contrast, Applicant's claimed invention uses transistor devices that have different characteristic threshold (or "turn-on") voltages to achieve a staged turn-on of parallel transistor devices. As described in the Applicant's specification at page 4, lines 12-17, "the FETs most commonly used in integrated circuits due to their lower voltage ratings have a threshold voltage between 0.4-0.5 volts. FETs designed for use in higher power applications typically have a threshold voltage between 0.6 and 0.7 volts. This 200-300 mV difference is used to advantage in the present invention to achieve a stepped-stage slew rate on the signal edges".

In Applicant's claimed invention, the second switchably conductive device is characterized by a greater threshold voltage than the threshold voltage of the first switchably conductive device. Thus, the voltage applied on the control inputs of the first switchably conductive devices must reach the first threshold voltage before the

first switchably conductive devices begin to turn on, and the voltage applied on the control inputs of the second switchably conductive devices must reach the second threshold voltage before the second switchably conductive devices begin to turn on. However, the required voltage at the control inputs of the first and second switchably conductive devices is different. In Davis, there is no indication that the voltage applied at the control inputs of the primary and secondary transistor devices is different - only that the applied voltage reaches the turn-on voltage level later for the primary transistor devices (N3, P3) than it does for the secondary transistor devices (N1, P1).

It is mentioned in Davis that the current-carrying capacity of the secondary transistors (N1, P1) may be smaller than the current-carrying capacity of the primary transistors (N3, P3). However, the current-carrying capacity of a transistor device does not definitively change the threshold voltage of the device. Accordingly, for all of the above reasons, Davis does not meet the limitation "a second switchably conductive device *characterized by a second threshold voltage greater than said first threshold voltage*" as recited in Applicant's Claim 3.

In addition, Davis does not meet the limitations "said first switchably conductive device ... responsive to a driving signal to allow current conduction from said voltage source to said node when said driving signal is offset from said voltage source by a voltage substantially equal to and greater than said first threshold voltage and to disallow said current conduction when said driving signal is offset from said voltage source by a voltage less than said first threshold voltage". The Examiner appears to be equating the voltage VIN with Applicant's recited "driving voltage". However, this equivalency cannot stand. As shown in FIGS. 2 and 3, the input signal VIN passes through inverters 12 and 14, NOR GATE 16/NAND gate 15 prior to reaching primary transistor device N1, P1. Clearly, when the input signal VIN is transitioning to turn the primary transistor device N1, P1 on, at the time the voltage VIN reaches a level equivalent to the characteristic threshold voltage of the primary transistor device N1, P1, this voltage has not yet appeared on the gate terminal of the primary transistor device N1, P1. Thus, even though the voltage VIN may be "offset from the voltage source by a voltage substantially equal to and greater than said first threshold voltage", as recited in Claim 3, the primary transistor device N1,

P1 is *not yet conducting*. Thus, Davis' VIN cannot be equated with Applicant's "driving voltage" because the limitation "said first switchably conductive device ... responsive to a driving signal *to allow current conduction* ... when said driving signal is *offset from said voltage source by a voltage substantially equal to and greater than said first threshold voltage*" is not met.

In addition, it is also clear that when the input signal VIN is transitioning to turn the primary transistor device N1, P1 off, at the time the voltage VIN reaches an offset below the characteristic threshold voltage of the primary transistor device N1, P1, this voltage has not yet appeared on the gate terminal of the primary transistor device N1, P1. Thus, even though the voltage VIN may be "offset from said voltage source by a voltage less than said first threshold voltage", as recited in Claim 3, the primary transistor device N1, P1 is *still conducting*. Thus, Davis' VIN cannot be equated with Applicant's "driving voltage" because the limitation "said first switchably conductive device ... responsive to a driving signal ... *to disallow said current conduction* when said driving signal is offset from said voltage source by a voltage less than said first threshold voltage" is not met.

The same arguments apply to the second switchably conductive devices. In particular, as shown in FIGS. 2 and 3, the input signal VIN passes through inverters 12 and 14, NOR GATE 16/NAND gate 15, inverter 42, 44, and transistor N2, P2 prior to reaching the secondary transistor device N3, P3. Clearly, when the input signal VIN is transitioning to turn the secondary transistor device N3, P3 on, at the time the voltage VIN reaches a level equivalent to the characteristic threshold voltage of the secondary transistor device N3, P3 this voltage has not yet appeared on the gate terminal of the secondary transistor device N3, P3. Thus, even though the voltage VIN may be "offset from the voltage source by a voltage substantially equal to and greater than said second threshold voltage", as recited in Claim 3, the primary transistor device N3, P3 is *not yet conducting*. Thus, Davis' VIN cannot be equated with Applicant's "driving voltage" because the limitation "said second switchably conductive device ... responsive to a driving signal *to allow current conduction* ... when said driving signal is *offset from said voltage source by a voltage substantially equal to and greater than said second threshold voltage*" is not met.

It is also clear that when the input signal VIN is transitioning to turn the secondary transistor device N3, P3 off, at the time the voltage VIN reaches an offset below the characteristic threshold voltage of the secondary transistor device N3, P3, this voltage has not yet appeared on the gate terminal of the secondary transistor device N3, P3. Thus, even though the voltage VIN may be “offset from said voltage source by a voltage less than said second threshold voltage”, as recited in Claim 3, the secondary transistor device N3, P3 is *still conducting*. Thus, Davis’ VIN cannot be equated with Applicant’s “driving voltage” because the limitation “said second switchably conductive device ... responsive to a driving signal ... to *disallow said current conduction* when said driving signal is offset from said voltage source by a voltage less than said second threshold voltage” is not met.

Thus, for all of the above reasons, Davis does not meet each and every limitation of Applicant’s Claim 3. In particular, Davis does not teach or suggest “a first switchably conductive device characterized by a first threshold voltage”, “said first switchably conductive device ... responsive to a driving signal to allow current conduction ... when said driving signal is offset from said voltage source by a voltage substantially equal to and greater than said first threshold voltage and to disallow said current conduction when said driving signal is offset from said voltage source by a voltage less than said first threshold voltage”, “a second switchably conductive device characterized by a second threshold voltage greater than said first threshold voltage”, “said second switchably conductive device ... responsive to said driving signal to allow current conduction ... when said driving signal is offset from said voltage source by a voltage substantially equal to and greater than said second threshold voltage and to disallow said current conduction when said driving signal is offset from said voltage source by a voltage less than said second threshold voltage”.

In addition, as described in detail above, the structure recited in claim 3 is *not substantially identical* to the circuit in the Davis reference. In particular, Davis does not teach any identical structure that can be equated with Applicant’s “driving signal” that meets the limitations “a first switchably conductive device characterized by a first threshold voltage, said first switchably conductive device ... to *allow current conduction* from said voltage source to said node *when said driving signal* is offset

from said voltage source by a voltage substantially equal to and greater *than said first threshold voltage*" or "a second switchably conductive device characterized by a second threshold voltage, said second switchably conductive device ... to *allow current conduction* from said voltage source to said node *when said driving signal* is offset from said voltage source by a voltage substantially equal to and greater *than said second threshold voltage* and to *disallow said current conduction* when said *driving signal* is offset from said voltage source by a voltage *less than said second threshold voltage*". Accordingly, since the claimed structure is not substantially identical to that of Davis, the claimed properties and functions cannot be presumed to be inherent.

It is well-settled in the law that "the fact that a certain result or characteristic *may* occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is *necessarily* present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. *The mere fact that a certain thing may result from a given set of circumstances is not sufficient.*' " *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999). Furthermore, "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic *necessarily* flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990).

Accordingly, per *Verdegaal Bros., Inc. v. Union Oil Co.*, *supra*, since Davis does not teach each and every element as set forth in claim 3, either expressly or inherently, a rejection of claim 3 in view of Davis is improper and the rejection of claim 3 under 35 U.S.C. § 102(b) should be withdrawn.

As per claim 4, claim 4 recites the same limitations as claim 3 and adds additional limitations. For the same reasons that Davis does not meet the limitations

of claim 3, Davis also does not therefore meet the limitations of claim 4.

Accordingly, the Applicant respectfully submits that the rejection of claim 4 under 35 U.S.C. § 102(b) should be withdrawn.

As per claim 1, claim 1 recites similar limitations as claim 3, in method form, including “a first switchably conductive device characterized by a first threshold voltage ... to allow current conduction from said voltage source to said node when said first input signal is offset from said voltage source by a voltage substantially equal to and greater than said first threshold voltage and to disallow said current conduction when said first input signal is offset from said voltage source by a voltage less than said first threshold voltage” and “a second switchably conductive device characterized by a second threshold voltage greater than said first threshold voltage ... to allow current conduction from said voltage source to said node when said second input signal is offset from said voltage source by a voltage substantially equal to and greater than said second threshold voltage and to disallow said current conduction when said second input signal is offset from said voltage source by a voltage less than said second threshold voltage”. For the same reasons that Davis does not meet the limitations of claim 3, Davis also does not therefore meet the limitations of claim 1. Accordingly, the Applicant respectfully submits that the rejection of claim 1 under 35 U.S.C. § 102(b) should be withdrawn.

As per claim 2, claim 2 recites the same limitations as claim 3 and adds additional limitations. For the same reasons that Davis does not meet the limitations of claim 1, Davis also does not therefore meet the limitations of claim 2. Accordingly, the Applicant respectfully submits that the rejection of claim 2 under 35 U.S.C. § 102(b) should be withdrawn.

As per claim 7, claim 7 recites similar limitations as claim 3, including “a first switchably conductive device characterized by a first threshold voltage ... to allow current conduction from said voltage source to said node when said first input signal is offset from said voltage source by a voltage substantially equal to and greater than said first threshold voltage and to disallow said current conduction when said first input signal is offset from said voltage source by a voltage less than said first threshold voltage” and “a second switchably conductive device characterized by a second threshold voltage greater than said first threshold voltage ... to allow current

conduction from said voltage source to said node when said second input signal is offset from said voltage source by a voltage substantially equal to and greater than said second threshold voltage and to disallow said current conduction when said second input signal is offset from said voltage source by a voltage less than said second threshold voltage". For the same reasons that Davis does not meet the limitations of claim 3, Davis also does not therefore meet the limitations of claim 7. Accordingly, the Applicant respectfully submits that the rejection of claim 7 under 35 U.S.C. § 102(b) should be withdrawn.

b. Claims 8-11

Claims 8 - 11 have been canceled. Accordingly, the rejections of claims 8 - 11 are now moot.

II. Rejections of Claims Under 35 U.S.C. § 103

1. Response to Rejections of Claims Under 35 U.S.C. § 103

The Applicant repeats all of the arguments presented with respect to Vajapey and Kaplinsky in the prosecution history to date. As presented in those arguments, neither Vajapey, Kaplinsky, nor any of the other prior art or record makes up for the deficiencies of Davis with respect to claim 3. Accordingly, Claim 3 could not be construed as being obvious over the prior art of record.

As per claim 5, claim 5 recites the same limitations as claim 3 and adds additional limitations. The limitations of claim 5 are not met for the same reasons that the limitations of claim 3 are not met by Davis, nor any of the other prior of record taken in any combination. Accordingly, the Applicant respectfully submits that the rejection of claim 5 under 35 U.S.C. § 103(b) should be withdrawn.

As per claim 6, claim 6 recites the same limitations as claim 3 and adds additional limitations. The limitations of claim 6 are not met for the same reasons that the limitations of claim 3 are not met by Davis, nor any of the other prior of record taken in any combination. Accordingly, the Applicant respectfully submits that the rejection of claim 6 under 35 U.S.C. § 103(b) should be withdrawn.

As per claim 9, claim 9 recites the same limitations as claim 3 and adds additional limitations. The limitations of claim 6 are not met for the same reasons that the limitations of claim 3 are not met by Davis, nor any of the other prior of

record taken in any combination. Accordingly, the Applicant respectfully submits that the rejection of claim 9 under 35 U.S.C. § 103(b) should be withdrawn.

As presented in the arguments presented with respect to Vajapey and Kaplinsky in the prosecution history to date, neither Vajapey, Kaplinsky, nor any of the other prior art or record makes up for the deficiencies of Davis with respect to claim 1. Accordingly, Claim 1 could not be construed as being obvious over the prior art of record.

As per claim 2, claim 2 recites the same limitations as claim 1 and adds additional limitations. The limitations of claim 2 are not met for the same reasons that the limitations of claim 1 are not met by Davis, nor any of the other prior of record taken in any combination. Accordingly, the Applicant respectfully submits that the rejection of claim 2 under 35 U.S.C. § 103(b) should be withdrawn.

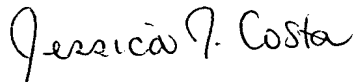
The application is now believed to be in condition for allowance.

CONCLUSION

In view of the foregoing remarks, it is respectfully submitted that none of the references cited by the Examiner taken alone or in any combination shows, teaches, or discloses the claimed invention, and that Claims 1-7 are in condition for allowance. Reexamination and reconsideration are respectfully requested.

Should the Examiner have any questions regarding this amendment, or should the Examiner believe that it would further prosecution of this application, the Examiner is invited to call the undersigned.

Respectfully submitted,



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